What is claimed is:

1. A controller for a water softener, said water softener having an ion exchange resin capable of receiving hard water ions from hard water during a softening step and releasing the hard water ions during a regeneration step, said controller comprising a processor programmed to cause termination of the softening step and initiate the regeneration step when both of a first and a second condition are met, said first condition being met when said resin is saturated with hard water ions, and said second condition being met when current demand for water is at or below a predetermined flow rate.

2. The controller of claim 1 further comprising an input from a hardness sensor used to determine when said first condition is met.

3. The controller of claim 1 further comprising data that is used by said controller is used to determine when said first condition is met.

4. The controller of claim 3 wherein said data is from a flow meter.

5. The controller of claim 1, wherein said controller comprises a microprocessor, one or more control valves driven by said microprocessor, a timer, and a user interface to receive input for said controller.

6. The controller of claim 1 further comprising data from a flow meter that is used by said controller to determine when said second condition is met.

7. The controller of claim 1 being configured for having a prescribed delay between monitoring operations when water demand exceeds said predetermined flow rate, said controller waits a prescribed delay time then determines the flow rate again.

8. A water softener comprising:

a housing;

an inlet to said housing for receiving inflow of hard water;

an outlet from said housing for dispensing outflow of treated water;

an ion exchange resin held within said housing for receiving hard water ions from the hard water during a softening step and releasing the hard water ions during a regeneration step;

a processor programmed to cause termination of a softening step and initiate a regeneration step when both of a first and a second condition are met, said first condition being met when said resin is saturated with hard water ions, and said second condition being met when current demand for soft water is at or below a predetermined flow rate.

9. The water softener of claim 8, further comprising an electronic hardness sensor for determining when said first condition is met.

10. The water softener of claim 8, further comprising electronic memory mounted on or held within said housing for storing information and calculating if said resin is saturated with hard water ions.

11. The water softener of claim 8, further comprising a flow meter for determining when said second condition is met.

12. The water softener controller of claim 8 further comprising one or more control valves, wherein said processor is configured for causing termination of said softening step and initiation of said regeneration step by movement of said valves causing one or more of said valves to change position.

13. The water softener controller of claim 8 wherein said processor is further programmed with alternate modes of regeneration.

14. The water softener controller of claim 13 wherein said processor further receives input as to the quality of said hard water and offers only said alternate modes of regeneration if the water hardness is sufficiently high or if iron is present in said hard water.

15. A method for controlling a water softener containing an ion exchange resin capable of receiving hard water ions during a softening step and releasing the hard water ions during a regeneration step, said method comprising:

initiating said softening step;

determining that a first condition is met when said resin is saturated with the hard water ions;

determining that a second condition is met when current treated water demand is at or below a predetermined minimum flow rate;

terminating said softening step when both of said first and second conditions are met; and

initiating said regeneration step.

16. The method of claim 15 further comprising obtaining data from a hardness sensor for determining if said first condition is met.

17. The method of claim 15 wherein determining when said first condition is met comprises storing information used to make said determination.

18. The method of claim 15 wherein determining when said first condition is met comprises obtaining data from a flow meter.

19. The method of claim 15 wherein said terminating step further comprises rotating a cam.

20. The method of claim 15 wherein determining when said second condition is met comprises obtaining data from a flow meter.

21. The method of claim 20 wherein when said current water demand is above said predetermined flow rate said controller waits a delay time, then redetermines if said current water demand exceeds said predetermined flow rate.

22. The method of claim 21 wherein said delay time is less than 30 minutes.